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EXAMINER	
VIDA, MELANIE M	
ART UNIT	**PAPER NUMBER**
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5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/489,226	CHOLEWO ET AL.	
	Examiner	**Art Unit**	
	Melanie M Vida	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _21 January 2000_ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-21_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-21_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _21 January 2000_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _4_ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement(s) (IDS) submitted on 4/24/00 has been considered by the examiner and is attached to this office action.

Claim Objections

2. **Claims 5-6** are objected to because of the following informalities: It appears that the "first color space" should be clearly re-stated as the "first gamut in the CMY color space", (claim 5, line 4; claim 6, line 2). changed claim, mr

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 recites the limitation "the CMYK space gamut" in line 11. There is insufficient antecedent basis for this limitation in the claim. cancelled claim mr

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by MacDonald, U.S. Patent 5,463,480, as cited by the applicant (hereinafter, MacDonald).

Regarding, **claim 1,** MacDonald teaches a flow diagram in figure 3A, which reads on "a method", that represents the apparatus in figure 2. Further, the method illustrates a forward model (11) to convert, which reads on "converting", an image in RGB color space (10), which reads on "a gamut in a first color space", to an image in XYZ space (13), which reads on "to a gamut in a second color space". Further, a forward color appearance model (14) converts, which reads on "converting", the XYZ image (13), which reads on "the gamut in the second color space" to a LCH image (16), which reads on "to a gamut in a third color space". Further, a gamut mapping (17) of the LCH image (16) is rescaled based on both the monitor and printer colour gamut data (18), which reads on "rescaling a lightness component of a gamut value in the third color space" to form a modified LCH image (19), which reads on "to form a modified gamut". The flow diagram continues in figure 3b, wherein the modified LCH image (19) is converted using the inverse colour appearance model (20), which reads on "converting the modified gamut" to obtain the XYZ image (22), which reads on "to a second gamut in the second color space".

6. **Claims 7, 8** are rejected under 35 U.S.C 102(e) as being anticipated by Holub, US Patent No. 6,043,909, (hereinafter, Holub).

Regarding, **claim 7,** Holub teaches of mappings of CIELAB color to CIELAB color', which reads on "modifying a CIELAB gamut having an L* component to form a modified CIELAB gamut; and", (col. 32, lines 50-53). Further, the CIELAB is converted to a calibrated RGB, which reads on "converting the modified CIELAB gamut to a color control space" by the conditioning table entries based on the data on GCR at each printable address, the maximum black constraint (step 149), at the first step is found, which reads on "subject to K constraints", and the maximum neutral density of L* at which the total area coverage limitation is satisfied (%UCR) is calculated (step 150) at the second step, which reads on ", and TAC constraints", (col. 32, lines 3, 8-10, 50-55).

Regarding, **claim 8,** Holub teaches of gamut rescaling by rescaling a lightness component of the CIELAB color space to prepare a color transformation, which reads on "modifying the CIELAB gamut having an L* component to forma modified CIELAB gamut comprises: linearly rescaling the L* component of the CIELAB gamut to form the modified CIELAB gamut", (col. 32, lines 66-67; col. 33, lines 9-16; col. 36, lines 17-20).

7. **Claim 10** is rejected under 35 U.S.C. 102(b) as being anticipated by Jacob et al US Patent No. 6,567,186, (hereinafter, Jacob).

Regarding, **claim 10,** Jacob teaches of obtaining a CIE L*a*b* (55) from a CMY or CMYK printer gamut space (54), as shown in figure 5, which reads on "obtaining a CIELAB space gamut from a CMY space gamut" (col. 3, lines 43-45; col. 4, lines 29-37). Further, a gamut mapping procedure equates the monitor CIE L*a*b* with the printer CIE L*a*b*, which

reads on "changing a lightness component of the CIELAB space gamut to form an enhanced CIELAB space gamut; and..." (col. 4, lines 32-35; 49-51). Jacob inherently teaches transforming the enhanced CIELAB space gamut to form a CMYK space gamut as evidenced by a printer gray map (56).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 2, 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over MacDonald, U.S. Patent 5,463,480 as applied to claim 1 above, and further in view of Lin et al. US Patent 6,185,004, (hereinafter, Lin).

Regarding, **claim 2,** MacDonald teaches the method of claim 1, but fails to expressly disclose, "...wherein rescaling a lightness component of a gamut value in the third color space to form a modified gamut comprises: modifying the gamut in the third color space by changing a lightness component of a color value in the third color space such that the upper surface of the gamut in the first color space is preserved and a lower surface of the gamut in the first color space is mapped to a bottom surface of the gamut of the second color space to form an expanded gamut in the third color space".

However, Lin teaches, as shown in figure 9, where the third color space L*, a*, b*, is compressed (25) for different device gamut, which reads on "...wherein rescaling a lightness

component of a gamut value in the third color space to form a modified gamut comprises:" (col. 15, lines 41-44). Out-of-gamut colors such as the color point (141) in figure 6B can be mapped into the correct gamut by compression of luminance levels in the range from L*=0 to 40 into the range from L*=30 to 40, where Luminance levels from L*=40 to 100 are unchanged, which reads on "modifying the gamut in the third color space by changing a lightness component of a color value in the third color space such that the upper surface of the gamut in the first color space is preserved and a lower surface of the gamut in the first color space is mapped to a bottom surface of the gamut of the second color space to form an expanded gamut in the third color space".

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify MacDonald's method with Lin's luminance level remapping.

One of ordinary skill in the art would have been motivated to remap luminance levels in order to account for differences in the range of luminance levels for input- and output-device gamut, given the express suggestion of MacDonald, (col. 6, lines 19-24), and Lin, (col. 15, lines 41-43).

Regarding, **claim 3,** MacDonald teaches, as shown in figure 3B, a CMY image (23) is converted, which reads on "converting in a first color space", to a CMYK image, which reads on "to a gamut in a second color space comprises…" A black printer generation (26) corresponding to black rules and parameters is applied to the CMY image (23), which reads on "applying a black generation method to the gamut in the first color space" to form a CMYK image, which reads on "to form the gamut in the second color space".

10. **Claims 4-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Edge et al. U.S. Patent No. 6,362,808 (hereinafter, Edge), and further in view of Lin et al. US, Patent No. 6,185,004.

Regarding, **claim 4,** Edge inherently teaches, "a CMY color space" as evidenced by an RGB source device is the same as a CMY source device, by subtractive algebra (CMY: C=1-R, M = 1 - G, Y=1-B), (col. 8, lines 42-48; col. 10, lines 54-57). Further, Edge teaches that the CMY source device can be converted to a CMYK destination device by calculating a K value based on the minimum values of C, M, and Y values, which reads as converting a gamut in a CMY color space to a gamut in a CMYK color space. Further, Edge teaches that the CMY values with the new K value can be used to compute the closest value of L* a* b*, which reads as converting the gamut in the CMYK color space to a gamut in a CIE LAB color space, the gamut in the CIELAB color space having a lightness component.

Edge does not expressly disclose modifying the gamut in the CIELAB color space by changing the lightness component such that the upper surface of the gamut in the CMY color space is preserved and the lower surface in the CMY color space is mapped to the bottom surface of the gamut of the CMYK color space to form a gamut in an expanded CIELAB color space; and transforming the gamut in the expanded CIELAB color space to form a second gamut in the CMYK color space.

However, Lin teaches that to modify the gamut in the CIELAB color space the lightness component, L, of the lower surface of the scanner gamut is rescaled L*=0 to 40 into L*=30 to 40 of the (CMYK) printer gamut, and leaving the upper levels of the scanner gamut L*=40 to 100 unchanged, which reads on "modifying the gamut in the CIELAB color space by changing the

lightness component such that the upper surface of the gamut in the CMY color space is preserved and the lower surface in the CMY color space is mapped to the bottom surface of the gamut of the CMYK color space to form a gamut in an expanded CIELAB color space, (col. 15, lines 53-60). Further, Lin inherently teaches, "transforming the gamut in the expanded CIELAB color space to form a second gamut in the CMYK color space" as evidenced by the printer gamut which is an indication that the output device dependent color space must be a CMYK gamut in order to print, and as further evidenced by figure 1, wherein the output device map (23) is converted from device independent color space (DICS) to an output –device dependent color space (DDCS), (31), (col. 5, lines 37-43; col. 15, lines 53-60).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Edge's color conversion with Lin's CIELAB conversion into CMYK gamut.

One of ordinary skill in the art would have been motivated to use the CIELAB to CMYK gamut conversion technique taught by Lin because two devices may have the same upper limit but different lower limits, given the express suggestion of Lin, (col. 15, lines 45-49).

Regarding, **claim 5,** Lin inherently teaches, "converting a gamut in a CMY color space having an upper surface and a lower surface to a gamut in a CMYK color space having a bottom surface" as evidenced in that an RGB source device corresponds to source coordinates in a CMY color space, by the following equations:

$C = 1 - R$

$M = 1 - G$

$Y = 1 - B$

(col. 8, lines 38-48). Further, Lin states a well-known color transformation technique named gray component replacement (GCR), to define the relationship between K values and CMY values, which reads on "applying a black generation method to a gamut in the first color space to form the second gamut in the CMYK color space", (col. 10, lines 54-60).

Regarding, **claim 6,** Lin states a well-known color transformation technique named GCR, to define the relationship between K values, and CMY values, which reads on "applying Gray Component Replacement (GCR) to the first gamut in the first color space to form the gamut in the second color space", (col. 10, lines 54-60).

11. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Holub, US Patent No. 6,043,909, (hereinafter, Holub) as applied to claim 7 above, and further in view of MacDonald, US Patent No. 5,463,480, (hereinafter, MacDonald).

Holub teaches the method of claim 7, wherein converting the modified CIELAB gamut to a color control space gamut subject to K constraints and TAC constraints:"

Holub does not expressly teach, "generating an inverse function of a forward function, the forward function is capable of mapping the color control space gamut to the modified CIELAB gamut and the inverse function is capable of mapping the modified CIELAB gamut to the control color space gamut".

However, MacDonald teaches of an inverse color appearance model (20) of a forward color appearance model (14), as shown in figures 3a-3b, that map an LCH image to a modified LCH image and a modified LCH image to an XYZ image, respectively, which reads on ""generating an inverse function of a forward function, the forward function is capable of

mapping the color control space gamut to the modified CIELAB gamut and the inverse function is capable of mapping the modified CIELAB gamut to the control color space gamut".

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Holub's color conversion technique with MacDonald's forward and inverse models.

One of ordinary skill in the art would have been motivated to use a forward and inverse model in order to "...enhance the perceptual colour space to more closely match the perceptual attributes of the human visual system", given the express suggestion of MacDonald, (col. 3, lines 32-36).

12. **Claim 11** is rejected under 35 U.S.C. 103(a) as being rejected over Jacob et al US Patent No. 6,567,186, as applied to claim 10 above, and further in view of MacDonald, US Patent No. 5,463,480, (hereinafter, MacDonald).

Regarding, **claim 11,** Jacob teaches all the features of "the method of claim 10, wherein obtaining a CIELAB space gamut from a CMY space gamut". Jacob teaches that printer CMY values (54) on the target color printer (18) are measured and stored as CIE LAB colors (55), which are used in a gamut mapping procedure to match monitor CIE LAB color table (30) with the printer CIE LAB color table, which reads as "transforming the CMYK space gamut to form an enhanced CIELAB space gamut by printing a plurality of patches to obtain the enhanced CIELAB space gamut", (col. 3, lines 45; col. 4, lines 21-33).

Jacob does not expressly teach "transforming the CMY space gamut to obtain a CMYK space gamut by including a black colorant in the CMY space gamut",

However, MacDonald teaches of a CMY image (23), which is transformed into a CMYK image through a black printer generation (26), as shown in figure 3b, which reads on "transforming the CMY space gamut to obtain a CMYK space gamut including a black colorant in the CMY space gamut".

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Jacob's color conversion method with MacDonald's color conversion method.

One of ordinary skill in the art would have been motivated to utilize a UCR under-colour removal black printer generation (26) with a CMY color gamut (23) because it is obvious to try and reduce the cost of color ink, because color ink is more expensive than K-ink (black).

13. **Claim 12** is rejected under 35 U.S.C. 103(a) as being rejected over Jacob et al US Patent No. 6,567,186, as applied to claim 10 above, and further in view of MacDonald, US Patent No. 5,463,480, and further in view of Holub, US Patent No. 6,043,909.

Regarding, **claim 12,** Jacob teaches the method of claim 10, but fails to expressly disclose "transforming a CMY space gamut to a CMYK space gamut by including a black colorant in the CMY space gamut to form the CMYK space gamut; and transforming the CMYK space gamut into a CIELAB space gamut".

However, MacDonald teaches of a CMY image (23), which is transformed into a CMYK image through a black printer generation (26), as shown in figure 3b, which reads on "transforming the CMY space gamut to obtain a CMYK space gamut including a black colorant in the CMY space gamut".

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Jacob's color conversion method with MacDonald's color conversion method.

One of ordinary skill in the art would have been motivated to utilize a UCR under-colour removal black printer generation (26) with a CMY color gamut (23) because it is obvious to try and reduce the cost of color ink, because color ink is more expensive than K-ink (black).

Jacob in view of MacDonald does not expressly disclose, "by computing the CIELAB space gamut from a model capable of mapping the MCYK space gamut into a CIELAB space gamut".

However, Holub teaches a method for converting CMYK into LAB, as shown in the equation, which reads on "by computing the CIELAB space gamut from a model capable of mapping the MCYK space gamut into a CIELAB space gamut" (col. 28, lines 55-60):

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Jacob in view of MacDonald's color conversion method, with Holub's color conversion step.

One of ordinary skill in the art would have been motivated to use Holub's color conversion step to calculate the partial derivatives of color with respect to ink to find the best solutions in linear or non-linear multidimensional spaces, given the express suggestion of Holub, (col. 28, lines 63-66).

15. **Claims 13-15, 20-21** are rejected under 35 U.S.C. 103(a) as being rejected over Lin, US. Patent No. 6,185,004, and further in view of Ohta, U.S. Patent No. 6,307,644, (hereinafter, Ohta).

Regarding, **claim 13,** Lin teaches a method of CMYK→L*a*b*, which reads on "a method comprising: obtaining a CIELAB space gamut from a CMYK space gamut", (col. 8, lines 23-24). Lin further teaches of re-mapping the minimum luminance level for a neutral color in the printer gamut, with the factors L*=0, to 40, and L*=100, to L*=40, which reads on "expanding the CIELAB space gamut by linearly rescaling the lightness components in the CIELAB space gamut using an L_{min}, L_{max}, and an L_{mincmy}; and..." (col. 15, lines 54-60). Lin teaches mapping L*a*b*→CMYK, which reads on "transforming the CIELAB space gamut into a second CMYK space gamut", (col. 8, lines 24-26).

Lin does not expressly disclose, "CMYK space gamut obtained from a CMY space gamut".

However, Ohta teaches, as shown in figures 12a-12b, that CMYK is obtained from a CMY space, (col. 7, lines 36-40).

At the time the invention was made, it would have been obvious to one of ordinary skill to modify Lin's method with Ohta's CMY→ CMYK conversion.

One of ordinary skill in the art would have been motivated to convert CMY→CMYK conversion in order to obtain density signals which are dependent on the output device, given the express suggestion of Ohta, (col. 1, lines 24-25).

Regarding, **claims 14-15,** Lin teaches of mapping the minimum luminance level for a neutral color in the printer gamut, by compressing the luminance level, which reads on

"computing a rescaling factor", with the factors L*=0, which reads on "L_{min}", and L*=100, which reads on "L_{max}", and Lx=40, which reads on "L_{MINCMY}", (col. 15, lines 54-60).

Regarding, **claim 20,** Lin teaches, as shown in figure 12, that the CPU (42) provides computing resources that execute embodiments of the method stored in storage control units (46, 47), which reads on "a computer-readable medium having computer-executable instructions for performing a method", (col. 6, lines 38-50). Lin further teaches of a CMYK→ L*a*b*, which reads on "obtaining a CIELAB space gamut having a lightness component, the CIELAB space gamut is obtained from a CMYK space gamut", (col. 8, lines 23-24). Lin further teaches of re-mapping the minimum luminance level for a neutral color in the printer gamut, with the factors L*=0, to 40, and L*=100, to L*=40, which reads on "expanding the CIELAB space gamut by linearly rescaling the lightness components in the CIELAB space gamut using an L_{min}, L_{max}, and an L_{mincmy}; and..." (col. 15, lines 54-60). Lin teaches mapping L*a*b*→CMYK, which reads on "transforming the CIELAB space gamut into a second CMYK space gamut", (col. 8, lines 24-26).

Lin does not expressly disclose, "a CMYK gamut which is obtained from a CMY space gamut;"

However, Ohta teaches, as shown in figures 12a-12b, that CMYK is obtained from a CMY space, (col. 7, lines 36-40).

At the time the invention was made, it would have been obvious to one of ordinary skill to modify Lin's method with Ohta's CMY→ CMYK conversion.

One of ordinary skill in the art would have been motivated to convert CMY→CMYK conversion in order to obtain density signals which are dependent on the output device, given the express suggestion of Ohta, (col. 1, lines 24-25).

Regarding, **claim 21,** Lin inherently teaches, "transmitting the second CMYK space gamut to an imaging unit", as evidenced by CMY_{ORIG}→ CMY_{CUR}, which reads on "transmitting to the second CMYK space gamut", and further evidenced by a control unit (52) that interfaces to an ink jet color printer (53), which reads on "transmitting the second CMYK space gamut to an imaging unit", (col. 6, lines 53-55; col. 20, lines 48-56).

16. **Claims 16-19** are rejected under 35 U.S.C. 103(a) as being rejected over Ohta, U.S. Patent No. 6,307,644, and further in view of Lin, US. Patent No. 6,185,004.

Regarding, **claim 16,** Ohta teaches an apparatus, as shown in figures 12A-12B, for converting from CMY→CMYK color space, which reads on "apparatus for transforming a CMY space gamut into a CMYK space gamut", (col. 7, lines 36-40). A CPU performs the process, which reads on "a processing unit", (col. 8, lines 52-53). Further, a program is stored in a RAM and ROM coupled to the CPU, which reads on "a memory unit coupled to the processing unit", (col. 8, lines 52-59). Further, a program of the embodiment is realized by software, which reads on "software means operative on the processing unit for:" (col. 8, lines 58-59). Ohta teaches a color conversion, as shown in the table of figure 5, and equation 3, for converting CMY to a lightness (L), 8-bit signal corresponding to the first color (C_1), and a second color (C_2), color space, which reads on "obtaining a CIELAB space gamut from a first CMY space gamut, the CIELAB space gamut having a plurality of values and each of the plurality of values having a lightness component", (col. 4, lines 44-52; col. 7, lines 11-14).

Ohta does not expressly teach the expanding step, or the transforming step.

However, Lin teaches of re-mapping the minimum luminance level for a neutral color in the printer gamut, with the factors L*=0, to 40, and L*=100, to L*=40, which reads on "expanding the CIELAB space gamut by changing the lightness components of at least one of the plurality of values of the CIELAB space gamut", (col. 15, lines 54-60). Lin teaches mapping L*a*b*→CMYK, which reads on "transforming the CIELAB space gamut into the CMYK space gamut", (col. 8, lines 24-26).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Ohta's apparatus with Lin's color gamut conversion steps.

One of ordinary skill in the art would have been motivated to do use Lin's color gamut conversion steps, in order to generate the appropriate density signal for the output device, given the express suggestion of Ohta, (col. 1, lines 20-25).

Regarding, **claim 17,** Ohta further teaches that the CPU can be a microprocessor (MPU), which reads on "wherein the processing unit is a microprocessor", (col. 8, lines 60-65).

Regarding, **claim 18,** Ohta inherently teaches, "an imaging unit coupled to the processing unit and capable of receiving the CMYK gamut and rendering an image from the CMYK gamut", as evidenced by the color conversion flowchart in figure 2, where a C"M"Y"K" is output to an output-device dependent CMYK data.

Regarding, **claim 19,** Ohta inherently teaches, "wherein the memory unit is a semiconductor memory" as evidenced by the storage medium for storing programs may include a non-volatile memory card, (col. 9, lines 1-8).

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lin et al. US 6,421,142 B1, see figure 10, and an improved out of gamut colors to gamut boundary method performed in Lab space (col. 8, lines 24-39; col. 11-12).

Rolleston et al. US 5,528,386, CMY conversion to CMYK, see figure2.

Jacob et al. US 5,978,011, generating CMYK from CMY, UCR, conversion to HIC color space, rescaling lightness values and mapping to an optimized CMYK color space (col. 1, lines 11-61; col. 4).

Schwartz et al. US Patent No. 5, 999,703, deriving a forward model, GCR analysis, and an output transform for the new color profile, see figure 1.

Sato et al. US Patent No. 6,501,563, a first-third conversion section in figure 4.

Huang et al. US Patent No. 6,386,670, a lightness mapping for a CMYK output gamut.

Chang et al. US 2002/0113982, a black generation method for CMYK color printer with LUT and interpolation.

Ohga, US Patent No. 6,542,634 an image processing apparatus that converts RGB through viewing condition 1, to viewing condition 2, to output a CMYK color space.

Imaizumi et al. US Patent No. 6,330,076, see figure 5, RGB to Lab, to Lab2, to Lab3, to RGB to YMCK.

Shimazaki US Patent No. 6,396,595, see figure 3, color scanner color space to CMYK, to a color correcting processor, to C'M'Y'K' space.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie M Vida whose telephone number is (703) 306-4220. The examiner can normally be reached on 8:30 am 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly A Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Melanie M Vida
Examiner
Art Unit 2626

MMV
mmv

November 2, 2003

KA Williams
KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER